Effects of stocker phase grazing system and implanting on performance and carcass characteristics of fall born calves

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STORY IN BRIEF

This report summarizes first year's data from a multi-year study designed to determine effects of stocker phase growth promoting implants and stocker phase grazing system on performance and carcass characteristics of fall-born calves. Sixty-four fall-born Angus and Angus x Hereford steers were sorted by weight and randomly allotted to one of four treatment combinations in a 2 x 2 factorial design. The two levels of stocker phase grazing system included late season tallgrass native range with protein supplementation from June 4, 2008 to December 1, 2008 (NR) and NR followed by wheat pasture grazing from December 1, 2008 to March 12, 2009 (NR-WP). The two levels of stocker phase implant included Component® TE-G administered on June 4, 2008 (Implant) and no implant (Control). Steers assigned to NR were implanted with Component® E-S upon feedlot arrival and implanted with Revalor® S after 90 d on feed. Steers assigned to NR-WP were reimplanted with Component® E-S on December 1, 2008 and implanted with Revalor® S upon arrival at the feedlot. Implantation increased ($P < 0.05$) ADG during both grazing periods. There was a tendency for grazing implants to increase ($P = 0.09$) dressing percent and reduce ($P = 0.09$) marbling score. Feedlot DMI was greater while feed efficiencies were lower for NR-WP steers. Feedlot ADG (4.71 vs. 4.07; $P < 0.01$) and rib eye area (11.98 vs. 13.46; $P < 0.01$) were increased for NR-WP steers. Similarly, there was a tendency ($P = 0.06$) for reduced calculated yield grade for steers managed in NR-WP system. Conversely, the NR-WP system reduced marbling score (471 vs. 430; $P = 0.03$). Implanting fall born calves increased performance when steers grazed tallgrass native range and during subsequent wheat pasture grazing. However, stocker phase implants and extended stocker phase grazing (wheat pasture) may reduce carcass marbling scores.

Key Words: grazing system, implants, carcass traits

INTRODUCTION

Grazing system during the stocker phase can dramatically affect feedlot entry weight, feedlot performance, and hot carcass weight (Gill et al., 1993a; Anderson et al., 2005; Griffin et al., 2007). However, published research provides inconsistent results relative to the impact of management system on carcass characteristics. Hickok et al. (1992) and Gill et al. (1993b) reported no differences in quality grade among calf-fed and yearling steers, while greater marbling scores for calf-fed steers vs yearling steers were observed by Anderson et al. (2005) and Brewer et al. (2007). In the southern Great Plains, wheat pasture is commonly used to grow cattle in the yearling system. Winterholler et al. (2008) found that marbling and yield grade was similar among herd mates fed as calves or yearlings grazed on wheat pasture for 164 d. We are aware of no published literature evaluating the effects of post-weaning grazing system (wheat pasture in particular) on performance and carcass characteristics of fall-born calves.

It is often suggested that implanting beef calves during the post-weaning stocker phase has a negative effect on quality grade. Research has not shown a significant decrease in marbling score of cross-bred cattle (McCann et al., 1991; Paisley et al., 1999). However, in these same studies there was a decrease in %Choice cattle when implanted during the grazing period. Kuhl et al. (1997) reported a 20% decrease in %Choice carcasses when Revalor-G or Ralgro was used during the stocker phase as compared to non-implanted controls. Brandt et al. (1995) compared season long and early intensive grazing strategies with or without implants and found that implanting with Synovex-S during the grazing period resulted in a 12% decrease in USDA Choice carcasses. Therefore, the objective of this study was to determine the effects of grazing system and the presence of a growth promoting implant during the grazing period on subsequent feedlot performance and carcass characteristics of fall-born steer calves.

MATERIALS AND METHODS

This trial was conducted at the Range Cow Research Center, North Range Unit and at Willard Sparks Beef Cattle Research Center (WSBCRC). Sixty-four fall-born Angus and Angus x Hereford steers were sorted by weight and randomly allotted to one of four treatment combinations in a 2 x 2 factorial design. The two levels of stocker phase grazing system included late season tallgrass native range with protein supplementation from June 4, 2008 to December 1, 2008 (NR) and NR followed by wheat pasture grazing from December 1, 2008 to March 12, 2009 (NR-WP). The two levels of stocker phase implant included Component® TE-G administered on June 4, 2008 (Implant) and no implant (Control). During the summer/fall grazing period, cattle were managed as a contemporary group and had access to 380 acres of tallgrass native range pasture at a stocking rate of approximately 6 acres per steer for 180 d. A 38% CP supplement containing monensin (320 g/ton) was supplied from mid June until December at a rate of 1 $lb \cdot steer^{-1} \cdot d^{-1}$. Supplement was delivered on Monday, Wednesday, and Friday. The amount of supplement fed on each of these 3 d was determined by calculating the amount of supplement needed per week (1 $lb \cdot steer^{-1}$ x 7 d) and then dividing by 3. Shrunk body weights were obtained at 28 d intervals of the grazing period. At the conclusion of the summer grazing period, all cattle were transported to WSBCRC where they were weighed, dewormed, and according to treatment implanted with Component® E-S (20 mg estradiol benzoate, 200 mg progesterone). At this time, NR-WP steers were transported to Marshall wheat pasture unit and grazed for 101 d while NR steers were blocked by weight and randomly allotted to one of eight pens via stocker phase implant treatment. After 90 d on feed (DOF), NR steers were reimplanted with Revalor® S. Upon arrival to the feedlot, NR-WP steers were allotted similarly to NR and also received a Revalor® S implant. All cattle were fed a finishing diet until 12th rib back fat was estimated to be between 0.5 and 0.6 in. At this time steers were harvested and carcass data were collected. Steers were weighed at 28 d intervals until harvest. Cattle were harvested and tag transfer completed in order to maintain identity of cattle as carcasses in cooler. After chilling 36 h, carcasses were graded and all quality and yield grade factors obtained.

To evaluate main effects of implant and grazing system on performance and carcass characteristics, the MIXED procedure of SAS (SAS Inc., Cary, NC) were used to separate means in this 2 x 2 factorial design. The alpha level to determine statistical significance was set at $\alpha = 0.05$. For grazing period performance and carcass measurements steer was the experimental unit. Pen was the experimental unit for feedlot performance. The statistical model for grazing

performance and carcass characteristics included implant treatment, grazing system and the implant x grazing system interaction as fixed variables. The statistical model for feedlot performance included pen, implant treatment, grazing system and implant treatment x grazing system as fixed variables and pen nested within block as the random variable.

RESULTS AND DISCUSSION

There was no significant ($P > 0.05$) implant treatment x grazing system interactions. Therefore, least squared means for main effects are shown in Tables 1 and 2. Steers assigned to the NR-WP system had greater feedlot entry weight ($P < 0.01$) than NR steers. Daily weight gain was greater for NR-WP steers than for NR steers (4.72 vs. 4.07, respectively; $P < 0.01$). Additionally, feed intakes were greater while feed efficiencies were lower for NR-WP as compared with NR. Hot carcass weight (831 vs. 876; $P < 0.05$) and rib eye area (11.98 vs. 13.46; $P < 0.01$) were increased for NR-WP steers. Similarly, there was a tendency ($P = 0.06$) for reduced calculated yield grade for steers managed in the NR-WP system. Conversely, the NR-WP system reduced marbling score (471 vs. 430; $P = 0.03$).

Table 1. Feedlot performance and carcass measurements of steers grazed in a season long (n = 32) or a season long plus wheat pasture (n = 31) grazing system

	Grazing System			*P*-Value
	NR	NR-WP	SEM[1]	Trt
Feedlot, lbs				
Initial BW	709	908	29.8	<0.01
Final BW	1387	1453	37.7	0.24
ADG	4.07	4.72	0.10	<0.01
DMI	22.76	27.13	1.08	0.01
F:G[2]	5.06	5.64	0.19	0.04
DOF[3]	147	116		
Carcass				
HCW, lbs	831	876	14.9	0.04
DP, %	62.2	62.2	2.14	0.99
BF, in	0.59	0.57	0.03	0.67
REA, in^2	11.98	13.46	0.28	<0.01
YG	3.78	3.37	0.15	0.06
Marbling Score[4]	471	430	13.6	0.03

[1]Standard error of the mean
[2]Feed to gain ratio
[3]Days on feed
[4]Choice (+) = 600; Choice (o) = 500; Choice (-) = 400; Select (+) = 350-399
[a,b]Means in the same row without a common superscript are different ($P < 0.05$).

Implanting steers increased ADG during both grazing periods as compared with those not implanted during the grazing period ($P < 0.05$). However, BW was not affected by implanting at any stage of production. During the finishing phase, DMI and feed to gain (F:G) were not affected by implant treatment. Steers implanted during the grazing phase had a trend ($P = 0.09$) for increased dressing percent. There was also a trend ($P = 0.09$) for increased marbling scores for cattle not implanted prior to placement in the feedlot. Even though there is a trend for differences in marbling score, both implanted and non-implanted steers had marbling scores high enough to qualify for the choice quality grade.

Table 2. Live performance and carcass measurements of steers implanted (n = 33) during the stocker phase or not implanted (n = 31) during the stocker phase

	Stocker Phase Implant Treatment			*P*-Value
	Control	Implant	SEM[1]	Trt
Tallgrass native range, lbs				
Initial BW, (6/4/08)	443	434	14.2	0.65
Final BW, (12/1/08)	705	720	17.3	0.53
ADG	1.45	1.59	0.04	0.02
Wheat pasture, lbs				
Initial BW, (12/1/08)	709	717	25.7	0.84
Final BW, (3/12/09)	890	938	26.6	0.20
ADG	1.79	2.06	0.08	0.01
Feedlot, lbs				
Initial BW	793	869	47.6	0.65
Final BW	1415	1425	39.6	0.87
ADG	4.53	4.26	0.2	0.23
DMI	24.08	25.08	1.4	0.62
F:G[2]	5.29	5.33	0.23	0.90
Carcass				
HCW, lbs	843	867	15.1	0.32
DP, %	61.99	62.49	2.2	0.09
BF, in	0.58	0.59	0.03	0.83
REA, in^2	12.67	12.76	0.3	0.83
YG	3.57	3.58	0.16	0.95
Marbling Score[3]	467	435	13.8	0.09

[1]Standard error of the mean
[2]Feed to gain ratio
[3]Choice (+) = 600; Choice (o) = 500; Choice (-) = 400; Select (+) = 350-399
[a,b]Means in the same row without a common superscript are different ($P < 0.05$).

Year one's results demonstrated that implantating fall born calves increased performance when steers grazed tallgrass native range and during subsequent wheat pasture grazing. However, stocker phase implants and extended stocker phase grazing (wheat pasture) may reduce carcass marbling scores.

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